

REMARKS

Claims 1-4 and 9-19 remain pending in the application. Claims 1, 4, and 9 have been amended without introduction of new matter. Favorable reconsideration is respectfully requested in view of the above amendments and the following remarks.

Claims 1-3 and 9-10 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Cansever (US Patent No. 6,678,252). This rejection is respectfully traversed.

Each of independent claims 1 and 9 has been amended to now recite “...forming one or more new network connections associated with one or more newly formed subnetworks” Support for these amendments can be found in the specification at least at, for example: paragraph 0043, which explains that route discovery influences the formation of new piconets; paragraph 0018, which explains that each Bluetooth® piconet or each Bluetooth® scatternet can be regarded as an IP subnet; and paragraphs 0038 and 0060-0061, which explain that, although Bluetooth® terminology is used to describe the invention, the invention is not limited exclusively to Bluetooth® technology.

The Office rightly acknowledges (e.g., in the middle paragraph on page 7 of the Office Action) that Cansever fails to disclose establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks. Therefore, Cansever fails to anticipate the subject matter defined by any of independent claims 1 and 9, or of their various dependent claims 2-3 and 10.

The patentability of claims 1-3 and 9-10 over a combination of Cansever and Toh C-K is further discussed below in connection with another ground of rejection.

For at least the foregoing reasons, it is believed that the subject matter defined by claims 1-3 and 9-10 is patentably distinguishable over the Cansever document. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. §102(e) be withdrawn.

Claims 4 and 12-17 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Cansever in view of Toh C-K (“Associativity-Based Routing for Ad-Hoc Mobile Networks” -- henceforth “Toh C-K”). This rejection is respectfully traversed.

The invention relates to establishing a route from a source to a destination in an ad-hoc network telecommunications system. In a system that, for example, utilizes Bluetooth® technology, establishing a route from a source to a destination typically involves the source node broadcasting a REQUEST message which requests a route to a stated destination. All nodes that are within range receive this REQUEST message. A node that receives the

REQUEST message but is neither the destination node nor a node with a valid route to the destination node, will rebroadcast the REQUEST message to its neighbors. When the destination node, or a node with a valid route to the destination node receives the REQUEST message, it limits network flooding by not rebroadcasting the REQUEST message, and it sends a Unicast REPLY message back to the source node.

As explained in the Background section of the instant application, typically, the source node uses the first reply message received, and it only requests a new route when the actual route breaks.

The Bluetooth specification has the INQUIRY and PAGE procedure to establish piconets but, at least at the time of the invention, failed to describe how these can be used to form efficient scatternets. Moreover, solutions at the time of the invention did not provide a procedure for nodes that have packets to send to a destination, wherein these nodes are not members of any piconet.

Embodiments defined by, for example, independent claim 12 address these issues by including various means that broadcast a route discovery request message for a route between the source node and the destination node over one or more connections associated with the one or more existing subnetworks if the source node is a member of one or more of the existing subnetworks; determine if a timely reply message is received by the source node in response to the broadcast route discovery request message; and establish a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks if it is determined that a timely reply message was not received.

Applicants' variously claimed embodiments are believed to be patentably distinguishable over any combination of Cansever with Toh C-K at least because neither of these documents discloses or suggests "means for establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks if it is determined that a timely reply message was not received". (Emphasis added.)

As mentioned earlier, the Office rightly acknowledges that Cansever fails to disclose establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks. However, the Office relies on Toh C-K as making up for this deficiency.

This reliance is unfounded because Toh C-K discloses an associativity-based routing technique for ad-hoc networks, wherein a node's associativity states imply periods of stability. Toh's technique comprises three phases: A route discovery phase, a route re-construction phase, and a route deletion phase. (See, e.g., Toh C-K at page 113, Section 5.)

The route discovery phase consists of a broadcast query (BQ) and an await reply (REPLY) cycle. A node desiring a route to the DEST broadcasts a BQ message, which is propagated throughout the ad-hoc mobile network in search of mobile hosts (MHs) which have a route to the destination (DEST). (See, e.g., Toh C-K at page 113, Section 5.1.) Once the BQ query has been broadcast by the source (SRC), all intermediate nodes (INs) that receive the query will check if it has previously processed the packet. If affirmative, the query packet will be discarded, otherwise the node will check if it is the destination. If it is not the destination, the IN appends its MH address/identifier at the IN IDs field of the query packet and broadcasts it to its neighbors. The associativity ticks with its neighbors will also be appended, along with its relaying load, link propagation delay and the hop count. (See, e.g., Toh C-K at page 114, first complete paragraph.)

Eventually, the DEST will, at an appropriate time after receiving the first BQ packet, know all the possible routes and their qualities. It can then select the best route and send a REPLY packet back to the SRC, via the route selected. (See, e.g., Toh C-K at page 114, last paragraph.)

Of great relevance to this discussion is how Toh C-K deals with the situation in which the SRC does not receive a timely reply to its BQ. Toh C-K, on page 115, second paragraph, describes this as follows:

There may be some rare instances when the SRC never receives DEST's REPLY because of some unexpected "not-yet-selected" INs' movement. In such circumstances, the SRC will eventually BQ-TIMEOUT and sends another BQ query. Since the downstream neighbour of the migrating IN realizes the associativity change, it will send a RN[STEP=1] (Route Notification) packet in the downstream direction, deleting all the downstream nodes invalid routing table entries. Another situation occurs when a selected IN moves while the REPLY propagation is still in progress. The upstream neighbour of the migrating node will perform a LQ[H] (Localised Query) process to discover a new partial route, while the

downstream neighbour sends a RN[1] packet towards the DEST, thereby erasing all invalid downstream nodes' routing entries. Hence, while the RRC is in progress, the REPLY packet continues to propagate towards the SRC.

(Emphasis added.)

It can be seen that, in each case, Toh C-K handles the situation merely by attempting some form of repeated BQ query. Nothing in this teaching describes or even suggests that an attempt will be made to form "one or more new connections associated with one or more newly formed subnetworks", as defined in Applicants' claims.

The Office attempts to support its rejection, in part, by relying on Section 5.1 of Toh C-K. However, it should be apparent from the above discussion that this section of Toh C-K does not in any way disclose or suggest forming new subnetworks.

The Office further attempts to support its rejection by arguing that Toh C-K shows this feature in Section 5.2.4 wherein partition of subnets due to the migration of a subnet-bridging MH and source invoking BQ query messages are mentioned. With all due respect, Applicants do not see how this can be so because Section 5.2.4 of Toh C-K merely describes the case in which the migration of a subnet-bridging MH beyond the radio coverage of its neighboring MHs will cause the mobile subnet to be partitioned. If an existing route does not span across the fragmented subnets, the route is not affected and only the subnet-bridging MH's upstream and downstream neighbors need to update their route and associativity entries. All other MHs remain ignorant and do not perform any route updates.

As for the case in which a subnet-bridging MH's migration does affect an existing route, Toh C-K has this to say:

However, if existing routes span across subnets (i.e. the subnet-bridging MH is an IN of the route), then the route is invalidated as the DEST is no longer reachable, despite any LQ or BQ attempts. *Under such circumstances, the LQ-RN cycle will eventually inform the SRC about the partitioning and the SRC can then invoke BQ query several times or it can inform the mobile user about the partitioning and prompt him to try later.*

(Emphasis added.)

(Toh C-K at page 117, last paragraph.)

Once again, Toh C-K merely describes repeating the BQ query process in the event of a failure. Applicants have not found anything in this or any other part of Toh C-K that describes or suggests “establishing a route between the source node and the destination node over *one or more new connections associated with one or more newly formed subnetworks* if it is determined that a timely reply message was not received”, as defined by Applicants’ claims.

Thus, even if the teachings of Cansever were to be combined with those of Toh C-K, that combination would still lack at least “establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks if it is determined that a timely reply message was not received”.

For at least these reasons, the subject matter defined by independent claim 12, as well as that defined by the dependent claims 13-17, is believed to be patentable to Applicants.

The subject matter defined by claim 4, which depends from independent claim 1, similarly recites “means for establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks, if it is determined that a timely reply was not received” (emphasis added), and is therefore believed to be patentable for at least the same reasons as those set forth above.

Although not subjected to this ground of rejection, it is further noted that, as now amended, each of independent claims 1 and 9 also recites “means for [determining/establishing] a route between the source node and the destination node by forming one or more new connections associated with one or more newly formed subnetworks” (emphasis added), and is therefore believed to be patentable to Applicants.

For at least the foregoing reasons, the subject matter defined by claims 4, and 12-17 is believed to be patentably distinguishable over the Cansever and Toh C-K documents, regardless of whether these are considered individually or in any combination. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. § 103(a) be withdrawn.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Cansever in view of Zyren (US Patent No. 6,377,608). This rejection is respectfully traversed.

Claim 11 depends from claim 9, and is therefore patentably distinguishable over the Cansever patent for at least the reasons set forth above. Zyren fails to make up for the deficiencies of Cansever, so that any combination of Cansever with Zyren would still fail to

include at least “means for establishing a route between the source node and the destination node by forming one or more new network connections associated with one or more newly formed subnetworks if it is determined that said request for route discovery between the source node and the destination node over existing network connections failed”, as defined by claim 11.

The Office does not argue to the contrary, but merely relies on Zyren as allegedly disclosing ad-hoc networks comprising Bluetooth® radios.

For at least the foregoing reasons, the subject matter defined by claim 11 is believed to be patentably distinguishable over any combination of Cansever with Zyren. Accordingly, it is respectfully requested that the rejection of claim 11 under 35 U.S.C. §103(a) be withdrawn.

Claims 18-19 stand rejected as allegedly being unpatentable over Cansever in view of Toh C-K and further in view of Zyren. This rejection is respectfully traversed.

Claims 18-19 variously depend from independent claim 12, and therefore define subject matter that is patentably distinguishable over any combination of Cansever with Toh C-K for at least the reasons set forth above. The Zyren patent fails to make up for the deficiencies of Cansever and Toh C-K, so that any combination of Cansever, Toh C-K, and Zyren would still lack at least “means for establishing a route between the source node and the destination node over one or more new connections associated with one or more newly formed subnetworks if it is determined that a timely reply message was not received.”

The Office does not argue to the contrary, but merely relies on Zyren as disclosing ad-hoc networks comprising Bluetooth® radios, and piconets in ad hoc networks.

For at least the foregoing reasons, the subject matter defined by claims 18-19 is believed to be patentably distinguishable over any combination of Cansever, Toh C-K, and Zyren. Accordingly, it is respectfully requested that the rejection of claim 18-19 under 35 U.S.C. §103(a) be withdrawn.

The application is believed to be in condition for allowance. Prompt notice of same is respectfully requested.

Respectfully submitted,
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